

## TacMed UPDATES

# K9 Tactical Emergency Casualty Care

## Direct Threat Care Guidelines

Lee Palmer, DVM, MS, DACVECC, CCRP, WEMT, NRP, EMT-T, TP-C;  
Allen Yee, MD, FACEP, FAAEM

*The Operational K9—Our companions, our teammates, our defenders—  
Let's protect those who protect us.*

### GOALS

1. Accomplish the mission with minimal casualties.
2. Maintain tactical superiority.
3. Expect to keep the canine (K9) team (handler and/or K9) maximally engaged in neutralizing the existing threat (e.g., active shooter, structural collapse, confined space, hazardous materials).
4. Maintain team safety by ensuring, when feasible, that the K9 handler is always involved when handling an injured K9.
5. Move the downed K9 team to a safe position and prevent any human or K9 casualty from sustaining additional injuries.
6. Treat immediately life-threatening hemorrhage.
7. Minimize public harm.

### Principles

1. The term Operational K9 (OpK9) refers to the distinct subpopulation of elite civilian working K9s that operate in high-threat or tactical environments. Examples include K9s that serve federal and local law enforcement (LE) and force protection agencies (e.g., police, Transportation Security Administration, Federal Bureau of Investigation, Bureau of Alcohol, Firearms, Tobacco, and Explosives, US Marshals Service, US Customs and Border Protection), and search-and-rescue groups (e.g., Federal Emergency Management Agency Urban Search and Rescue, various Sheriff's County search-and-rescue K9 teams).
2. Establish and maintain tactical control and defer in-depth medical interventions if engaged in ongoing direct threat (e.g., active fire fight, structural collapse, dynamic postexplosive scenario).
3. Threat mitigation techniques will minimize risk to casualties and the providers. These should include techniques and tools for rapid casualty access and egress.

- a. It is highly recommended that OpK9s operating in a tactical environment wear a body-type harness to assist in rapid extraction/extrication from the hot zone.
- b. K9 handling and restraint
  - i. Any injured or stressed K9 is considered unpredictable and may bite, even its own handler.
  - ii. *Consider* applying a muzzle prior to handling a conscious K9 when no contraindications to muzzling exist (e.g., upper airway obstruction, respiratory complications, severe facial trauma, heat-related injuries, vomiting, comatose state).
  - iii. Handlers should carry a quick application type of muzzle in a known, easily accessible location for expedient handler/team use when and if needed.
- c. It is strongly urged to have *at least two* alternate team members or designated first responders (e.g., emergency medical services [EMS], fire departments) trained in basic K9 handling techniques for situations when the handler is down.
  - i. When feasible, these personnel should have a well-established and positive rapport with OpK9s they support.
  - ii. It is recommended that only select members are granted this level of rapport to prevent decreasing the reliability of the K9 asset.
- d. Threat mitigation to rescuer and casualty ALWAYS takes priority.
  - i. DO NOT delay extraction time to a safe zone for the sole purpose of applying a muzzle on an injured K9.
  - ii. Handler/responder must weigh the benefits and risks of muzzling the K9 based upon the likelihood of a re-emerging threat.
  - iii. Consider that in situations where a threat reappears, a muzzled K9 will no longer be able

- to protect the downed handler or continue the mission.
4. *Triage* should be deferred to a later phase of care. Prioritization for extraction is based on available resources and the tactical/operational situation.
  5. Limited first aid at the point of injury is warranted.
  6. *Consider* deferring airway management until indirect threat care (ITC), if appropriate based on the tactical situation.
  7. *Consider* hemorrhage control for life-threatening bleeding in an injured K9 if tactically feasible.
    - a. **Direct pressure** is the primary medical intervention to be considered during direct threat care (DTC) for the K9 casualty.
    - b. *Consider* securing dressing material in place with application of a circumferential pressure bandage during DTC, if tactically feasible.
    - c. *Consider* an improvised tourniquet (ITQ) application as a **last resort** for extremity or tail wounds involving amputations and for which hemorrhage is not controlled by direct pressure alone.
    - d. *Consider* quickly placing or allowing the injured K9 to remain in a position of comfort that protects the airway, permits ease of respiration, and is least stressful.
    - e. Depending on the situation, the position of comfort in most K9s is sternal (i.e., prone) recumbency. They may also prefer to sit or stand, which is acceptable if it is amenable to the tactical situation.
4. K9 handler down.
    - a. When the K9 handler is injured and team members and or responders are not close to assist, then the handler (if possible) should:
      - i. Engage the threat and immediately apply self-aid when feasible.
      - ii. If hostile threat is neutralized, secure the OpK9 by any quick, expedient method. A loose, aggressive, or anxious K9 may be a threat to rescuers and prevent extraction or provision of medical aid to the downed handler.
    - b. If the K9 team is down and unresponsive, or is responsive but cannot move, the scene commander or team leader should weigh the risks and benefits of a rescue attempt in terms of manpower, likelihood of success, and mission sustainment.
      - i. *Consider* remote medical assessment techniques.
      - ii. Recognize that threats are dynamic and may be ongoing, requiring continuous threat assessments.
  5. Stop life-threatening external hemorrhage, if tactically feasible.
    - a. Remember, the primary goal during DTC is to quickly remove the K9 casualty and handler/rescuer away from the direct imminent threat (e.g. "Get off the X").
      - i. *Consider* moving the K9 casualty to safety (behind cover) before applying direct pressure or a tourniquet (TQ) if the situation allows.
    - b. **Direct pressure**
      - i. Remains the primary tenet of controlling external hemorrhage in K9s under DTC.
    - c. **Wound packing and hemostatic agents**
      - i. Often not tactically feasible to perform appropriately under DTC
      - ii. May consider *loosely* packing (i.e., wadding or stuffing) dressing into the wound and then securing with a quick application pressure wrap as situation permits.
    - d. **Tourniquets:**
      - i. **Not** considered first-line treatment for controlling extremity hemorrhage in K9s because most human commercial, windlass TQs (e.g., Combat Application Tourniquet® [Composite Resources Inc.; <http://combattourniquet.com/>], SOF® Tactical Tourniquet [Tactical Medical Solutions; <https://www.tacmedsolutions.com/product/sof-tactical-tourniquet-wide/>]) do not work effectively on K9 extremities.
      - ii. *Consider* TQ application in K9s under the following conditions:
        - (c) Extremity hemorrhage appears **life threatening** (e.g., K9 has suffered a complete traumatic limb or tail amputation), AND
        - (d) Bleeding remains **refractory** to other methods of hemostasis (e.g., direct pressure, pressure dressing), AND

### K9 Tactical Emergency Casualty Care (TECC): DTC Hot Zone Guidelines

1. Mitigate any threat (e.g., return fire, use less lethal technology, assume an overwhelming force posture, extraction from immediate structural collapse or fire, stop the burning process) and move to a safer position.
2. Keep the K9 casualty or K9 team engaged in any tactical operation, if appropriate and until threat is neutralized.
3. K9 casualty extraction: The handler/responder should secure and extract an injured K9 from the hot zone to a safe location in a way that does not further jeopardize human life (self or team):
  - a. *Avoid* exposing themselves or other team members to an imminent threat for the sole reason of extracting an injured OpK9.
  - b. *Engage* and *neutralize* the threat or ensure the active threat is neutralized before rendering aid or extracting the OpK9 casualty.
  - c. When the handler/responder is already behind cover and separated from an injured K9, they should remain under cover and attempt to call and direct the K9 to their location, because some injured OpK9s may remain ambulatory.

- (e) The anatomic site is **amenable** to TQ application (i.e., mainly limbs and tail wounds).
- iii. When a TQ is warranted (e.g., under Section 4.d.ii.), consider applying an ITQ or wide, elastic, nonwindlass TQ (e.g., SWAT-T® [TEMS Solutions; <http://www.swattourniquet.com/>])
  - (a) ITQs may be constructed from material such as a cravat, long-sleeved shirt, or back pack strap (**at least 3.8cm or 1.5 inches wide**).
  - (b) A stick, small metal bar, or even a long-bladed knife firmly seated in its sheath may be used as the torsion (i.e., windlass) device.
- iv. Apply the ITQ as proximal (i.e., high on the limb or tail) as possible or **at least 2–3 inches** above the wound.
- v. **DO NOT** apply ITQ directly over a joint or wound.
- vi. Tighten until cessation of bleeding AND loss of palpable distal pulses. Optimal use of limb TQs must result in **both**
  - (a) Cessation of bleeding, AND
  - (b) Loss of distal pulses in the extremity.
- vii. **Expose and clearly mark** all TQ sites with an indelible marker.
  - (a) Indicate **date** and **time** of application.
  - (b) Do not cover a TQ.
- e. **Immobilize** and **elevate** the area when practical and feasible. Keep the K9 as calm as possible to avoid inadvertent elevations in arterial blood pressure.
- f. *Consider* quickly placing the K9 casualty in position to protect airway, if tactically feasible.

## DTC Skill Sets

1. Move to safety.
2. Make safe (e.g., muzzle, restrain) the K9, as warranted.
3. Massive hemorrhage control:
  - a. Direct pressure
  - b. Application of ITQ as last resort for distal extremity or tail hemorrhage
4. Casualty movement and extraction
5. Rapid placement in recover position

## K9 TECC: ITC Warm Zone

### GOALS

1. Goals 1–6 as above with DTC care
2. Stabilize the K9 casualty as required to permit safe extraction to dedicated treatment sector or medical evacuation assets

## Principles

1. Maintain tactical control and complete the overall mission.
2. As applicable, ensure safety of first responders and K9 casualties by always:
  - a. Keeping the K9 handler involved when handling or treating an injured K9.
  - b. *Considering* muzzling the K9 when no contraindications to applying muzzle exist (e.g., respiratory complications, heat-related injuries, vomiting, comatose state) and if not performed during DTC.
  - c. *Considering* early use of chemical restraint for injured K9s that are fractious and potentially aggressive because of pain, stress, and/or fear.
  - d. Training medical providers with the likelihood for treating injured K9s in safe K9 handling techniques.
3. Conduct dedicated patient assessment and initiate appropriate life-saving interventions as outlined in the following ITC guidelines.
4. **DO NOT DELAY** casualty extraction/evacuation for non-lifesaving interventions.
5. *Consider* establishing a casualty collection point if multiple casualties are encountered.
6. Unless in a fixed casualty collection point, triage in this phase of care should be limited to the following categories:
  - a. Uninjured
  - b. Deceased/expectant
  - c. All others
7. Establish communication with the tactical and/or command element and request or verify initiation of casualty extraction/evacuation.
8. Prepare casualties for extraction and document care rendered for continuity-of-care purposes.

## K9 ITC Warm Zone Guidelines

1. **Restraint.** Properly restrain K9 per guidelines described under DTC.
  - a. Consider the K9's mouth and teeth as equivalent to an LE officer's weapon and, therefore, it should be made safe if the K9 is injured and/or the K9 has an altered mental status.
  - b. Secure once the threat is neutralized.
  - c. *Consider* early use of chemical restraint for injured K9s that are fractious and potentially aggressive because of pain, stress, and/or fear.
    - i. Follow local veterinary-approved protocols or refer to in the *K9 TECC Supplement* (<http://www.k9tecc.org/resources.html>) for chemical-restraint protocols.
2. **Bleeding.** Reassess for massive hemorrhage.
  - a. Reassess interventions applied for massive hemorrhage performed during DTC.
  - b. Assess for and control any other unrecognized sources of major hemorrhage.

- c. Direct pressure:
    - i. If not already done, apply **direct pressure** and pressure dressing with **deep-wound packing** to control life-threatening external hemorrhage.
  - d. Wound packing:
    - i. Consider controlling junctional hemorrhage (inguinal or axillary) or other deep, compressible hemorrhaging wounds if the bleeding site is not controlled by direct pressure application alone.
      - (a) Performed for major junctional hemorrhage and upper extremity wounds above the elbow and stifle (i.e., triceps, caudal thigh)
      - (b) Not very effective or necessary on most K9 distal limb wounds (i.e., below elbow and knee/stifle) because of lack of significant musculature
    - ii. Impregnated hemostatic dressing or standard roll gauze may be used for wound packing.
      - (a) Topical hemostatic agents are to be applied in the form of an impregnated gauze dressing. Apply in accordance with manufacturer's guidelines.
      - (b) **DO NOT** apply **powdered or granular forms** of hemostatic agents directly to the wound.
    - iii. Refer to K9 TECC Supplement or local veterinary-approved protocols for guidance on deep-wound packing for K9s (e.g., types of material, wound packing protocol).
  - e. Tourniquet:
    - i. Reassess all TQs that were applied during previous phases of care by exposing the injury and determining if a TQ is needed.
    - ii. TQs applied hastily during DTC phase that are determined to be both *necessary* and *effective* in controlling hemorrhage should remain in place if the casualty can be rapidly evacuated to definitive veterinary care.
    - iii. *Consider* conversion to pressure or hemostatic dressing and bandage if:
      - (a) TQ is deemed ineffective for controlling hemorrhage
      - (b) Bleeding can be controlled by other methods, such as with direct pressure, pressure bandage, and/or deep-wound packing
      - (c) If there is any potential delay in evacuation to care (>2 hours), expose the wound fully and reassess need for TQ around the 2-hour time point
      - (d) Refer to K9 TECC Supplement for guidance on TQ conversion.
    - iv. Before releasing a TQ on a casualty that has received intravenous (IV) fluid resuscitation for hemorrhagic shock, ensure a positive response to resuscitation efforts (e.g., improving mentation and peripheral femoral pulses are normal).
  - v. When time and the tactical situation permit, a distal pulse check should be accomplished on any extremity on which a TQ remains in place. To eliminate a distal pulse or visual hemorrhage, if still present, consider:
    - (a) Additional tightening of the TQ, and/or
    - (b) Use of a second juxtaposed TQ, side by side and proximal to the first.
  - vi. Reasons to consider **NOT** removing TQ include:
    - (a) The distal extremity or tail is a complete amputation
    - (b) The K9 casualty remains in shock or is suffering traumatic brain injury (TBI).
    - (c) The TQ has been on for **>6 hours**.
    - (d) Medical treatment facility is **within 2 hours** after time of application.
    - (e) Considered inadvisable to transition to other hemorrhage control methods on basis of the tactical or medical situation.
  - vii. **Expose and clearly mark** all TQ sites with the time of TQ application.
  - f. Consider using a junctional TQ for difficult-to-control junctional hemorrhages (e.g., axilla and inguinal placements) in K9s. *Note:* The Abdominal Aortic Junctional Tourniquet (AAJT™; Compression Works; <http://compressionworks.com>) has not been evaluated in K9s, but has been evaluated in swine models and shown effective.
  - g. **Immobilize** (i.e., splint) and **elevate** the injured area whenever feasible.
  - h. **Reassess** frequently for evidence of rebleeding.
- ### 3. Airway management.
- a. **Unconscious** casualty *without airway obstruction*:
    - i. Place the K9 casualty in the recovery position, this typically is in a sternal (i.e., prone) position.
    - ii. Extend the head and neck into a straight in-line position.
    - iii. Physically open the mouth and pull tongue forward to help open the airway and allow examination of the mouth and pharyngolaryngeal area.
      - (a) *Consider* using a roll of tape or syringe tube casing (without a plunger) as a mouth gag to keep the mouth open.
  - b. K9 casualty *with airway obstruction* or impending airway obstruction:
    - i. Clinical signs: Pawing at mouth, gagging, excessive drooling, frequent swallowing motions, extended head and neck, elbows and upper legs held out from the chest (i.e., "tripod position"), reluctant to lie down, and cyanosis (bluish gums) as a late sign.



- ii. Evaluation:
  - (a) It is not advised to stick your hand into the mouth of a conscious K9. Consider team safety for not suffering bite wounds:
    - 1) Use a leash, rope, or roll gauze looped behind the upper canine teeth to pry the mouth open.
    - 2) If in your scope of practice, consider sedating the K9 *in accordance with local veterinary-approved protocols or refer to in the K9 TECC Supplement for chemical-restraint recommendations.*
  - (b) Position the K9 in any position that allows the K9 to breath with minimal restriction of air flow and protects the airway, even if that involves a sitting position.
  - (c) Observe for bilateral chest rise and fall.
  - (d) Listen for labored or noisy breathing (e.g., stridor, stertor)
  - (e) Palpate throat and trachea.
  - (f) Open airway as described in *paragraph 3.a.ii*
- iii. Intervention:
  - (a) For patients with an observable obstruction, quickly remove any obvious **moveable** foreign material from the oropharyngolaryngeal area.
  - (b) BE CAREFUL not to push the object down further into the airway.
    - 1) If foreign material is not readily visible, **DO NOT** perform blind two-finger sweep of the mouth and pharynx.
  - (c) *Consider* abdominal thrusts (i.e., Heimlich maneuver) for **moveable** foreign bodies. **NOTE:** NEVER attempt abdominal thrusts if sharp objects such as sticks or bones are present.
  - (d) If attempts to clear or remove the object or obstruction from the airway have failed and the K9 collapses, consider initiating:
    - 1) Direct visualization and removal with Magill forceps or similar instrument
    - 2) Chest compressions (100–120 compressions/min)
    - 3) Artificial ventilation via bag-mask-valve technique or mouth to snout at a rate of 8–10/min
    - 4) If within scope of practice and training, pursue *advanced airway techniques* (e.g., needle or surgical cricothyrotomy)
  - (e) If partial airway obstructions (i.e., some air is able to flow into the lungs), transport as soon as possible and continuously monitor for progression to complete airway obstruction. **DO NOT** delay on-scene time.
- c. Advanced airway techniques: If previous measures are unsuccessful at clearing the airway, the provider is properly trained, and the intervention is within the provider's scope of practice, then perform:
  - i. Orotracheal (OTT)/endotracheal intubation (ETT):
    - (a) Preferred technique in K9s for gaining patent airway, because of ease of ETT placement as compared to humans
    - (b) To facilitate ETT placement, ensure head and neck are extended (not flexed) and in line. This will allow a direct line of sight or path from the oral cavity through the pharyngolaryngeal area and into the trachea.
    - (c) A laryngoscope is not often required for K9 OTT/ETT, but it is helpful.
    - (d) Common sizes for a 25–30kg K9 are 9–11mm internal diameter.
  - ii. Blind insertion airway device:
    - (a) Not considered first line. ETT placement is preferred, but consider if ETT is not available.
    - (b) Consider placing a 37–41F Comitube (Medtronic, <http://www.medtronic.com/us-en/index.html>).
    - (c) King laryngeal tubes (Ambu, <http://www.ambu.com>) and I-Gel® (Intersurgical Ltd.; <http://www.intersurgical.com/info/igel>) have not been clinically evaluated in K9s; laryngeal mask airways often become dislodged during movement.
  - ii. Needle or surgical cricothyrotomy:
    - (a) Use the same procedure as described for humans.
    - (b) Use chemical restraint *in accordance with approved veterinary guidelines or K9 TECC Supplement*, and local lidocaine, if conscious.
  - iii. Needle or surgical tracheostomy:
    - (a) Not recommended over cricothyrotomy because it is more invasive, time consuming, and has a higher rate of complications.
    - (b) Use chemical restraint (*see K9 TECC Supplement or local veterinary approved protocols*) and local lidocaine if conscious.
  - iv. **NOTE:** If cervical spinal cord injury is suspected, try to maintain the head and neck in a neutral, in-line position; avoid excessive flexion or extension of the neck.
- d. Consider administering oxygen supplementation, if available.
- e. If no spontaneous ventilations, provide artificial respirations at **8–10/min.**

- f. Monitor oxygen saturation (if available). Normal values are >94% on room/atmospheric air.
    - i. Pulse oximetry probe placement in order of preference: tongue (if unconscious), lip, ear pinna, prepuce (male) or vulva (female).
4. **Respiration.**
- a. All **open and/or sucking chest wounds** should be treated by immediately applying a gloved hand over wound, followed by a vented or nonvented occlusive seal to cover the defect.
    - i. Rapidly **clip hair** (if feasible; this is *not* necessary) around the wound, to allow the seal to become airtight. *Note:* Clipping is often not a necessary step, because of the elasticity of K9 skin.
    - ii. If hair clippers are not available, place a water-soluble lubricant (or other water-soluble medium, e.g., blood) on the underside of the chest seal to form an occlusive seal between the skin and the chest seal.
    - iii. Secure in place on all four-sides (vented or nonvented) with adhesive tape.
  - b. Monitor the casualty for the potential development of a subsequent **tension pneumothorax (T-PTX)**.
  - c. Consider the presence of a T-PTX in the setting of known or suspected thoracic trauma AND include progressive respiratory distress and increasing respiratory rate, with the following clinical signs:
    - i. Rapid, shallow, and open-mouth breathing
    - ii. Acting agitated or unable to get comfortable
    - iii. Head and neck extended and elbows and upper front legs held out away from body (i.e., tripod position)
    - iv. Asynchronous breathing pattern (i.e., abdomen and chest move in opposite directions during inspiration)
    - v. Barrel-chested with minimal chest excursion (more abdominal component)
    - vi. Lack of drive and response to even basic commands, unwillingness to move
    - vii. Reluctance to lie down
    - viii. Cyanotic (blue) gums (a late finding)
    - ix. Collapse
  - d. If T-PTX is present or develops, consider:
    - i. **“Burping”** the occlusive chest seal, AND/OR
    - ii. **Needle decompression** (if within scope of practice and training)
      - (a) Performed with a 14-gauge, 2- to 3.25-inch (8cm) needle/catheter
      - (b) Insert in the **seventh to ninth intercostal space** midway up the lateral thoracic wall.
      - (c) Ensure that the needle enters **cranially (i.e., toward the head) of the rib**.
      - (d) Insert the needle **perpendicular** to the chest wall.
  - e. Once in the pleural space, direct the needle ventrally (i.e., toward the sternum) and lay the needle against the thoracic wall.
    - 1) Ensure the bevel of the needle faces away from the inner thoracic wall.
  - f. Once air is evacuated, remove both the stylet and catheter. DO NOT leave in place.
    - 1) The increased elasticity of the K9's skin prevents adequate securing of the catheter and/or stylet and, thus, increases the risk of further lung trauma if the stylet/catheter is left in place.
  - g. Consider decompressing the chest on **both sides (left and right)**: K9s have a fenestrated /communicating mediastinum that allows air to infiltrate both sides.
- e. **Penetrating thoracic foreign body** (e.g., knife, arrow, rebar):
- i. If still in place, DO NOT REMOVE but SECURE object in place. Only consider removing impaled object if it:
    - (a) Interferes with establishing a patent airway or performing cardiopulmonary resuscitation (CPR);
    - (b) Cannot be adequately secured in place for evacuation or transport; or
    - (c) Cannot be removed from the scene or transported with the K9 (e.g., K9 impaled on rebar sticking out from a concrete flooring).
  - ii. Place occlusive seal (e.g., saran wrap, meal ready-to-eat wrapper, commercial chest seal) around the impaled object and seal edges of occlusive seal with adhesive tape.
  - iii. Stabilize and secure (e.g., with bandaging) the foreign body to prevent further injury.
  - iv. Perform needle decompression as needed if T-PTX develops.
  - v. Transport (**injury up**) as soon as possible with no pressure on penetrating object.
5. **Circulation (IV/interosseous [IO] access).**
- a. If evacuation to definitive care is >30 minutes, consider placing at least an 18-gauge IV catheter (or larger bore) in at least one peripheral vein (the cephalic vein in either front leg is preferred).
  - b. If resuscitation is required and IV access is not obtainable, use the IO route (per agency protocol and training). Recommended IO locations in the K9, in order of preference:
    - i. Flat anteromedial surface of the **proximal tibia** (1–2cm distal to the tibial tuberosity; *preferred route*, because of ease of placement and location of landmark; 15–25 mm IO catheters often work well.
    - ii. Greater tubercle of the **humerus**. (Similar insertion technique as humans). Often requires an adult-length IO catheter.

6. **Tranexamic acid (TXA) or epsilon-aminocaproic acid (EACA).**
  - a. If casualty is anticipated to need significant blood transfusion (e.g., presents with hemorrhagic shock, one or more amputations, penetrating torso trauma, or evidence of severe bleeding) *consider* administration of one of the following as soon as possible and **NO LATER than 3 hours** postinjury:
    - i. 10 mg/kg TXA in 100mL normal saline (NS) or lactated Ringer's solution (LR) IV slowly over 15 minutes.
    - ii. 150mg/kg EACA in 100mL NS or LR slowly over 15 minutes; may continue as an infusion at 15–20mg/kg/h for 8 hours.
  - b. **NOTE:** Evidence supporting the appropriate dosage of TXA or EACA in K9s is currently limited. Studies are being conducted.
7. **Fluid resuscitation.**
  - a. Assess for hemorrhagic shock
    - i. Altered mental status (in the absence of head injury) and weak/absent peripheral **femoral** pulses are the best field indicators of shock.
    - ii. Abnormal vital signs:
      - (a) Systolic blood pressure (SBP) <90mmHg and heart rate >140 bpm, or a shock index (HR/SBP) >1.
      - (b) *Refer to K9 TECC Supplement or K9 TECC resources page (<http://www.k9tecc.org/resources.html>) for expected changes in K9 vital parameters.*
  - b. **NOT in shock:**
    - i. No IV fluids necessary.
    - ii. Per os (PO) fluids permissible if:
      - (a) Conscious, able to swallow, and has no injury requiring potential surgical intervention, AND
      - (b) Confirmed long delay in evacuation to care.
8. **If in shock:**
  - a. **Goal** is to maintain perfusion, not necessarily to restore to normal perfusion values.
  - b. Administer appropriate IV fluid bolus and reassess casualty's perfusion parameters (in accordance with local veterinary-approved protocols or refer to the *K9 TECC Supplement for fluid resuscitation protocols*).
    - i. Repeat bolus as appropriate based on clinical response.
  - c. If K9-specific blood products are available, consider resuscitation with fresh-frozen plasma (FFP) and packed red blood cells (PRBCs) in a 1:1 ratio.
  - d. If a K9 casualty with an altered mental status due to **suspected TBI** has a weak or absent peripheral pulse, resuscitate as necessary to maintain a desired SBP  $\geq$ 90mmHg or a strong palpable femoral pulse. Avoid restoring SBP >120mmHg with suspected TBI.
9. **Hypothermia.**
  - a. Minimize casualty's exposure to the cold elements.
  - b. Move patient from cold environment or element to warm shelter.
  - c. Transport patient in a horizontal/sternal position.
  - d. Remove any wet outer wear (e.g., vests, harnesses, booties).
  - e. *Gently* pat dry any wet tissues or hair coat. Avoid vigorous rubbing.
  - f. Place the casualty on an insulated surface as soon as possible.
  - g. Cover the casualty with a commercial warming device, dry blankets, poncho liners, sleeping bags, or anything that retains heat and keeps the casualty dry.
  - h. **ALWAYS** handle markedly hypothermic patients (i.e., < 86°F [30°C]) gently to avoid triggering cardiac dysrhythmias.
  - i. Primary efforts should concentrate on treating and preventing hypothermia (as described above) and transporting patient gently to a medical care facility.
10. **Ocular (eye) trauma.**
  - a. *Consider* flushing the affected eye and adjacent tissues with copious amounts of sterile saline or ophthalmic rinse.
  - b. Nonpenetrating injuries:
    - i. Protect the eye from further injury.
    - ii. If available, place a commercial or improvised (e.g., bucket with bottom cut out) Elizabethan-type collar on the K9 to prevent self-trauma.
    - iii. *Consider* covering the uninjured eye to reduce the level of anxiety as well as reduce "sympathetic" movement of the injured eye.
  - c. Penetrating eye trauma:
    - i. If a penetrating eye injury is noted or suspected, protect the eye from external pressure and stabilize any impaled object to prevent movement during extraction.
  - d. *Refer to K9 TECC Supplement or local veterinary-approved guidelines under "Ocular Trauma" for further guidance.*
11. **Reassess casualty.**
  - a. Perform secondary survey (head-to-tail full-body examination), checking for additional injuries. Reassessment includes:
    - i. **Inspection** (visual observation),
    - ii. **Palpation** (hands-on assessment), and
    - iii. **Auscultation** (auditory assessment).
  - b. Consider focused assessment of identified localized injured areas.
  - c. Reassess vital parameters (e.g., heart rate, respiratory rate, pulse quality, capillary refill).
12. **Wounds and fractures.**

- a. **Important: Handle** an injured K9 with a fracture with extreme care and proper restraint. Consider administering a chemical restraint and analgesia before manipulating the fractured site. (*Refer to K9 TECC Supplement for drug protocols.*)
  - b. Inspect for and dress additional closed or open wounds and fractures:
    - i. Consider splinting known or suspected fractures if time and resources permit.
    - ii. Rapidly identify and attend to open abdominal wounds.
  - c. *Refer to K9 TECC Supplement or follow local veterinary-approved guidelines for wound and fracture management protocols.*
13. **Analgesia/sedation.**
- a. Provide adequate analgesia as necessary for the injured K9.
  - b. For K9s **able** to continue mission:
    - i. **DO NOT** use any human-derived nonsteroidal antiinflammatory medications (e.g., aspirin, ibuprofen, naproxen, ketorolac) in K9s.
    - ii. When available, consider: tramadol 3–5mg/kg every 6–8 hours PO (75–125mg for a 25kg K9).
    - iii. Use caution when attempting to administer oral medications to an injured K9 in pain.
  - c. For K9s **unable** to continue mission:
    - i. Consider narcotic (opiate) medications.
      - (a) IV, IO, or intramuscular (IM) pure mu ( $\mu$ )-agonist opiates (e.g., morphine, fentanyl, hydromorphone) are the most effective.
      - (b) **NOTE:** Oral opiates are not effective and intranasal/transmucosal fentanyl (e.g., lozenges) have not been fully evaluated in K9s.
    - ii. Consider ketamine (at analgesic dosages) for moderate to severe pain.
      - (a) Ketamine must be combined with a benzodiazepine (e.g., midazolam, diazepam, lorazepam) in K9s.
    - iii. Consider adjunct administration of antiemetic medications (e.g., ondansetron).
  - d. *Refer K9 TECC Supplement or local veterinary-approved guidelines for analgesia protocols.*
14. **Antibiotics.**
- a. Consider initiating antibiotic administration for K9 casualties with open wounds or fractures, or penetrating eye injury when evacuation to definitive care is significantly delayed or infeasible.
  - b. This is generally determined in the mission planning phase and requires **medical oversight**.
  - c. If antibiotics are warranted, select either a cephalosporin or potentiated penicillin (e.g., amoxicillin-clavulanic acid, cephalexin).
  - d. **NOTE: Ertapenem:** Currently, there are no pharmacokinetic data on this antibiotic use in K9s. Because of the very limited information available regarding its use in K9s, it is considered an investigational treatment. If this is the only antibiotic available, then suggested dosage is to use the human pediatric dose of 15mg/kg IV or IM every 12 hours, not to exceed a daily dosage of 1g (e.g., 25kg OpK9 = 375mg dose).
15. **Burns.**
- a. **Important:** Analgesia in accordance with K9 TECC guidelines should be considered for all K9 burn casualties.
  - b. Consider burns may not be readily evident in K9s because their hair coat covers skin lesions effectively.
    - i. Hot liquids seep under hair coat and, therefore, only an area of wet, oily, or greasy hair may be present.
    - ii. A K9 often reacts to a painful burn by displaying agitation and continually biting, licking, or rubbing the affected area. Look for these behavioral signs to help support any suspicion that a K9 may have been burned.
  - c. Immediately remove the K9 from the burning source and stop the burning process.
    - i. Remove all harnesses, collars, vest, booties, and so forth. Avoid pulling away any items that are melted and have stuck to the K9's skin.
  - d. Consider inhalational/airway injury in any K9 trapped in a confined-fire environment and with any one of the following clinical signs: carbonaceous sputum, singed facial or nasal hairs, facial burns, oropharyngeal edema, vocal changes (stridorous), or altered mental status.
    - i. Facial burns, especially those that occur in closed spaces, may be associated with **inhalation** and **corneal** injuries.
    - ii. Aggressively monitor airway status and oxygen saturation (Spo<sub>2</sub>) in such patients and consider early definitive airway management for respiratory distress or oxygen desaturation. **Note:** Consider Spo<sub>2</sub> may appear normal because most devices do not differentiate between carbon monoxide (CO) and oxyhemoglobin.
  - e. *Consider* treating ocular/corneal injuries (e.g., flushing eyes, applying topical nonpreserved lubricant).
  - f. **Smoke inhalation**, particularly in a confined space, may be associated with significant CO and cyanide toxicity. Patients with signs of significant smoke inhalation plus:
    - i. Significant symptoms of CO toxicity should be treated with **high-flow oxygen**, if available.



- ii. Significant symptoms of cyanide toxicity should be considered candidates for **cyanide antidote** administration, if available (*see K9 TECC Supplement for cyanide antidote options*).
  - g. Estimate total body surface area (TBSA) burned to the nearest 10%, using the appropriate, locally approved burn TBSA estimate calculation (*see K9 TECC Supplement or see [www.k9tecc.org/resources](http://www.k9tecc.org/resources) for K9 Casualty Care Card*).
  - h. **Local and minor burns** (i.e., superficial or partial thickness <15% TBSA): Consider cooling burned skin with cool to cold water (sterile fluid, if available) within 20 minutes of burn incident.
    - i. Avoid actively cooling (e.g., irrigation, application of ice) burns >15% TBSA to prevent inducing hypothermia.
    - ii. Cover the burn area with **dry, sterile** dressings and initiate measures to prevent heat loss and hypothermia once cool irrigation is completed (if performed).
  - i. For **moderate to severe burns** (i.e., >20% TBSA) or any **full-thickness** burn (i.e., third or fourth degree):
    - i. Fluid resuscitation should be initiated as soon as IV/IO access is established. (*Refer to K9 TECC Supplement under "Burns."*)
    - ii. If hemorrhagic shock is also present, resuscitation for hemorrhagic shock takes precedence over resuscitation for burn shock. (*Refer to K9 TECC Supplement under "Shock – Fluid Resuscitation" or locally approved veterinary guidelines.*)
    - iii. **DO NOT** actively cool by applying ice and/or water to burned area.
    - iv. Cover the burn area with dry, sterile dressings and initiate measures to prevent heat loss and hypothermia once cool irrigation is completed, if performed.
    - v. Aggressively act to **prevent hypothermia** for burns >0% TBSA.
  - j. All previously described casualty care interventions can be performed on or through burned skin for a burn casualty.
16. **Monitoring.**
- a. Periodically, obtain and record vital signs (i.e., temperature, pulse, respiration, pulse quality, mucous membrane color, capillary refill time, mentation).
  - b. If available electronically, monitor:
    - i. Sp<sub>o</sub><sub>2</sub> via tongue (if unconscious), lip, ear pinna, prepuce or vulva, rectum (if rectal probe available)
    - ii. Electrocardiogram
    - iii. End-tidal carbon dioxide (ETCO<sub>2</sub>) level (if intubated)
    - iv. Noninvasive blood pressure
17. **Prepare K9 casualty for movement.**
- a. Consider environmental factors for safe and expeditious evacuation.
  - b. Secure casualty to a movement-assist device, when available.
  - c. If vertical extraction is required, ensure casualty is secured within appropriate harness, equipment is assembled, and anchor points are identified.
18. **Communicate with the K9 casualty to provide reassurance.**
- a. If available, ensure K9 handler travels with the K9 to provide restraint, comfort, and reassurance (this is important for both the handler and the K9).
  - b. Encourage and provide positive reassurance to the injured K9 by stroking the K9's hair coat and/or patting the K9 on the head if they are not aggressive.
19. **Cardiopulmonary resuscitation.**
- a. CPR within a tactical or high-threat environment for victims of blast or penetrating trauma who have **no pulse, no ventilations, and no other signs of life** is not often successful and, therefore, should not be attempted during ITC. May have a greater role for consideration during the evacuation phase.
  - b. May benefit those patients suffering cardiopulmonary arrest (CPA) after electrocution, hypothermia, atraumatic arrest, or submersion injury and, therefore, should be considered in the context of the tactical situation.
  - c. *Consider* bilateral needle decompression for K9 casualties suffering torso or polytrauma with **no respirations or pulse** to ensure T-PTX is not the cause of cardiac arrest before discontinuation of care.
  - d. *Refer to K9 TECC Supplement or K9TECC resources* ([www.k9tecc.org/resources](http://www.k9tecc.org/resources)) *for veterinary CPR guidelines.*
20. **Documentation of care.**
- a. Document clinical assessments, treatments rendered, and changes in the casualty's status in accordance with local protocol.
  - b. Forward this information with the casualty to the next level of care.
  - c. Consider implementing a **K9 Casualty Care Card** (located in K9 TECC Supplement and at [www.k9tecc.org/resources](http://www.k9tecc.org/resources)) that can be quickly and easily completed by a nonmedical first responder.

### ITC Warm Zone Skill Set

1. **Hemorrhage control.**
  - a. Apply direct pressure.
  - b. Apply pressure dressing.
  - c. Apply wound packing.
  - d. Apply hemostatic agent.

- e. Apply/reassess improvised or elastic tourniquet (last resort).
2. **Airway.**
  - a. Apply manual maneuvers (position head and neck, straight and in line).
  - b. Perform endotracheal intubation.
  - c. Perform needle or surgical cricothyrotomy/tracheotomy.
3. **Breathing.**
  - a. Application of effective occlusive chest seal
  - b. Assist ventilations with bag-valve-mask.
  - c. Apply oxygen.
  - d. Apply occlusive dressing.
  - e. Perform needle chest decompression (consider bilateral).
4. **Circulation.**
  - a. Gain intravascular access.
  - b. Gain IO access.
  - c. Administer IV/IO medications and IV/IO fluids.
  - d. Administer blood products.
  - e. Keep warm.
5. **Wound management.**
  - a. Protect the injured eye.
  - b. Apply dressing for evisceration.
  - c. Apply extremity splint.
  - d. Initiate basic burn treatment.
  - e. Initiate treatment for TBI.
6. **Prepare casualty for evacuation.**
  - a. Move casualty (e.g., drag, carry, lift).
  - b. Apply spinal immobilization devices.
  - c. Secure casualty to litter.
  - d. Initiate hypothermia prevention.
7. **Other skills.**
  - a. Perform hasty decontamination.
  - b. Initiate casualty monitoring.
  - c. Establish casualty collection point.

**NOTE:** Care provided within the ITC guidelines is based on individual first responder training and scope of practice, available equipment, local medical protocols, and medical director approval.

## K9 TECC: Cold Zone Evacuation

### GOALS

1. Maintain any lifesaving interventions conducted during DTC and ITC phases.
2. Provide rapid and secure extraction to an appropriate level of care.
3. Avoid additional preventable causes of death.

### Principles

1. Reassess the casualty or casualties.
2. Use a triage system or criteria per local policy that consider priority AND destination and includes both human and K9 casualties.

3. Use additional resources to maximize advanced care.
4. Avoid hypothermia.
5. Communication is critical, especially between tactical and nontactical EMS teams and veterinary resources.
6. Maintain situational awareness. In dynamic events, there are NO threat-free areas (e.g., green or cold zone)

### Guidelines

1. **Primary goal.**
  - a. The M<sup>2</sup>ARCH<sup>2</sup> principles performed during ITC are similar in evacuation care.
  - b. Reassess all interventions applied in previous phases of care, DTC, and ITC.
  - c. If multiple wounded (humans and K9s), perform primary triage for priority AND destination.
  - d. Consider using the traditional approach to primary assessment by evaluating airway and breathing before bleeding/circulation.
2. **Airway management.**
  - a. Unconscious K9 *without* airway obstruction: **Same as ITC.**
  - b. Downed K9 *with* airway obstruction or impending airway obstruction:
    - i. Initially, same as ITC
    - ii. If previous measures unsuccessful, it is prudent to consider OTT/ETT or needle/surgical cricothyrotomy or tracheostomy (with lidocaine, if conscious).
  - c. If intubated, reassess for respiratory decline in patients with potential pneumothoraces
  - d. Consider the mechanism of injury and the need for spinal immobilization. (See Neurological Trauma below).
    - i. Consider most conscious K9s may need chemical restraint to remain immobilized. (*Refer to K9 TECC Supplement or locally approved veterinary protocols.*)
    - ii. Spinal immobilization may not be necessary for downed K9s with penetrating trauma if the K9 appears neurologically intact.
3. **Breathing.**
  - a. Immediately apply an occlusive bandage to all open and/or sucking chest wounds that were not treated before transport.
  - b. Monitor the K9 for the potential development of a subsequent T-PTX. Clinical signs of a T-PTX in K9s include, for example, progressive respiratory distress, hypoxia, and/or hypotension in the setting of known or suspected thoracic trauma.
  - c. Treat T-PTX as described in ITC (i.e., “burping” chest seal or needle decompression). Repeat steps as needed to mitigate respiratory distress.
    - i. **ALWAYS** consider decompressing both left and right sides of the chest in K9s

- ii. For situations with prolonged transport times that require multiple decompressions, consider placing a thoracostomy tube (again, pending the provider experience and scope of practice).
  - d. If available, consider administration of oxygen to maintain SpO<sub>2</sub> at approximately 94% for all traumatically injured K9s and any K9 with:
    - i. Low SpO<sub>2</sub> by pulse oximetry (<94%)
    - ii. Injuries associated with impaired oxygenation (e.g., pulmonary contusion, smoke inhalation)
    - iii. Unconsciousness
    - iv. TBI (maintain SpO<sub>2</sub> >90%)
    - v. Circulatory shock
    - vi. Casualties with pneumothoraces
4. **Bleeding.**
- a. Reassess all interventions and sources of major hemorrhage for bleeding.
  - b. Control all sources of major bleeding with appropriate use of direct pressure, deep-wound packing, and pressure bandages.
  - c. Avoid use of TQs as first-line intervention in K9s to control bleeding, except for:
    - i. Situations in which hemorrhage remains uncontrolled despite application of direct pressure dressing, hemostatic agents, or deep-wound packing
    - ii. Areas that are anatomically appropriate (limb or tail) for TQ application
    - iii. A traumatic total or partial amputation of an extremity
  - d. Reassess all TQs that were applied during previous phases of care. Expose the injury and determine if a TQ is needed.
  - e. Tourniquets applied in prior phases that are determined to be both necessary and effective in controlling hemorrhage should remain in place if the casualty can be rapidly evacuated to definitive medical care.
  - f. If TQ is ineffective in controlling hemorrhage or if there is any potential delay in evacuation to care, identify an appropriate location 2–3 inches above the injury, and apply a new TQ.
  - g. If delay to definitive care longer than 2 hours is anticipated and the wound for which TQ was applied is anatomically amenable, attempt a TQ downgrade. *Refer to K9 TECC Supplement for guidance on TQ conversion.*
  - h. A distal pulse check should be performed on any limb on which a TQ is applied. If a distal pulse or active bleeding is still present, consider:
    - i. Additional tightening of the original TQ, or
    - ii. The use of a second TQ, juxtaposed (i.e., side by side) and proximal to the first
  - i. **Expose and clearly mark** all TQ sites with the date and time of TQ application. Use an indelible marker.
5. **TXA or EACA.**
- a. If casualty is anticipated to need significant blood transfusion (i.e., presents with hemorrhagic shock, one or more amputations, penetrating torso trauma, or evidence of severe bleeding), consider administration of one of the following as soon as possible and **NO LATER THAN 3 hours** postinjury:
    - i. 10mg/kg TXA in 100mL NS or LR IV slowly over 15 minutes
    - ii. 150mg/kg EACA in 100mL NS or LR slowly over 15 minutes; after initial bolus, may consider continued infusion at 15–20mg/kg/h for 8 hours
6. **Circulation.**
- a. Reassess casualty for hemorrhagic shock (i.e., altered mental status in the absence of brain injury, weak or absent peripheral pulses, and/or change in pulse character).
  - b. Establish IV or IO access, if not performed already performed in ITC.
  - c. Restore perfusion as recommended in ITC. (*Refer to K9 TECC Supplement for shock and fluid resuscitation.*)
  - d. If BP monitoring is available, maintain a **SBP of 80–90mmHg.**
    - i. For a K9 casualty with an altered mental status due to **suspected TBI**, maintain a desired SBP ≥90mmHg or a strong palpable femoral pulse.
      - (a) For TBI, consider using a **low-volume fluid strategy** comprising hypertonic saline combined with a synthetic colloid.
    - ii. If in shock and K9-specific blood products are available, with appropriate provider scope of practice/local protocols, resuscitate with 1:1 ratio of PRBCs to FFP.
      - (a) If K9 blood-component therapy is not available, consider collecting and transfusing fresh whole blood, if veterinary-approved protocols, appropriate training, and methods of compatibility testing are in place.
  - e. Further administration of IV fluids to maintain hemodynamic stability must take into the consideration transport time as well as the adverse effects on the patient that may be invoked by using large-volume fluid resuscitation.
    - i. If transport times are anticipated to **exceed 2 hours**, consider administering small aliquots of fluids to maintain targeted BP/clinical perfusion parameters or consider starting a low-rate infusion of:
      - (a) **Synthetic colloids** (low-molecular weight, preferred) at 1mL/kg/h, OR
      - (b) **Isotonic crystalloids** at 2mL/kg/h
7. **Prevention of hypothermia.**

- a. Minimize casualty's exposure to the elements; move into medic unit, vehicle, or warmed structure, if possible.
  - b. If not performed already during previous phases of care:
    - i. Remove any wet overgarments and dry the casualty.
    - ii. Place the casualty on an insulated surface as soon as possible.
    - iii. Cover the casualty with commercial warming device, dry blankets, poncho liners, sleeping bags, or anything that will retain heat and keep the casualty dry.
  - c. If available and required to maintain perfusion, provide warm IV fluids.
8. **Monitoring.**
- a. Periodically, obtain and record vital signs (i.e., temperature, pulse, respiration, pulse quality, mucous membrane color, capillary refill time, mentation)
  - b. If available, electronically monitor:
    - i. Pulse oximetry
    - ii. Electrocardiogram
    - iii. ETCO<sub>2</sub> (if intubated)
    - iv. Noninvasive blood pressure
9. **Reassess patient.**
- a. Perform secondary survey to check for additional injuries.
  - b. Inspect/dress known wounds and splint known/suspected fractures that were previously deferred. Recheck pulses/warmth of bandaged limbs.
  - c. Attend to any suspected or known blunt or penetrating eye injuries:
    - i. Protect the eye from external pressure.
    - ii. Stabilize any impaled object to prevent movement during transport and movement.
  - d. **Important:** Handle an injured K9 with a fracture with extreme care and proper restraint. Consider administering a chemical restraint and analgesia before manipulating the fractured site.
  - e. Refer to *K9 TECC Supplement for Wound and Ocular Trauma Management and recommended analgesia/chemical restraint protocols.*
10. **Analgesia/sedation.**
- a. Provide adequate analgesia as necessary as described under ITC and *K9 TECC Supplement.*
  - b. **DO NOT** use any human-derived nonsteroidal antiinflammatory medications (e.g., aspirin, ibuprofen, naproxen, ketorolac) in K9s.
11. **Antibiotics.**
- a. Consider initiating antibiotic administration for K9 casualties with open wounds/fractures and penetrating eye injury when evacuation to definitive care is significantly delayed or infeasible.
  - b. This is generally determined in the mission planning phase and requires **medical oversight.**
- c. If antibiotics are warranted, select either a cephalosporin or potentiated penicillin (e.g., amoxicillin-clavulanic acid, cephalexin).
12. **Burns.**
- a. Consider burns may not be readily evident in K9s because their hair coat covers cutaneous lesions effectively.
  - b. Burn care is consistent with the principles described in ITC. For recommended interventions refer to the "**Burns**" section in *K9 TECC Supplement.*
  - c. Smoke inhalation, particularly in a confined space, may be associated with significant CO and **cyanide toxicity.** Patients with signs of significant smoke inhalation plus:
    - i. Significant symptoms of CO toxicity should be treated with high-flow oxygen, if available.
    - ii. Significant symptoms of cyanide toxicity should be considered candidates for cyanide antidote administration. (Refer to *K9 TECC Supplement for cyanide antidote options.*)
  - d. Be cautious of **off-gassing** from patient in the evacuation vehicle if there is suspected chemical exposure (e.g., cyanide) from the fire.
  - e. Consider **early airway management** if there is a prolonged evacuation period and the patient has signs of significant airway thermal injury (e.g., singed facial hair, oral edema, carbonaceous material in the posterior pharynx, and respiratory difficulty).
  - f. Provide adequate analgesia for all burn patients.
  - g. Aggressively act to prevent hypothermia for burns >20% TBSA.
13. **Prepare K9 casualty for movement.**
- a. Consider environmental factors for safe and expeditious evacuation.
  - b. Secure casualty to a movement-assist device when available.
  - c. If vertical extraction is required, ensure casualty is secured within appropriate harness, equipment is assembled, and anchor points are identified.
14. **Communicate** with the K9 casualty to provide reassurance.
- a. If available, ensure K9 handler travels with the K9 to provide restraint, comfort, and reassurance (this is important for both the handler and the K9).
  - b. Encourage and provide positive reassurance to the injured K9 by stroking the K9's hair coat and or patting the K9 on the head if the K9 is not aggressive.
15. **CPR.**
- a. May have a beneficial role for patients suffering CPA from electrocution, hypothermia, nontraumatic arrest, or drowning
  - b. **Note:** Consider bilateral needle decompression for casualties with thoracic or blunt polytrauma



with no respirations or pulse to ensure T-PTX is not the cause of CPA before discontinuation of care.

- c. For CPR guidelines in K9s, *see recommendations listed in K9 TECC Supplement, under CPR.*

**16. Documentation of care.**

- a. Contact and relay the following information to the receiving veterinary facility:
  - i. Estimated time of arrival
  - ii. **Mechanisms of the injury** sustained (e.g., smoke inhalation, blunt versus penetrating trauma)
  - iii. **Index of suspicion** for the seriousness of unseen injuries
  - iv. Initial and trends in **vital parameters**
  - v. **K9's known or suspected injuries**
  - vi. Overall condition or status (e.g. vital signs, mentation, neurological)
  - vii. **Interventions** performed
  - viii. Patient's **response** to interventions
- b. Continue or initiate documentation of clinical assessments, treatments rendered, and changes in the casualty's status, in accordance with local protocol.
- c. Transfer information with the casualty to the next level of care either verbally or in writing.
- d. Considering implementing a **K9 Casualty Care Card** (*see K9 TECC Supplement*).

for nonveterinary licensed personnel to practice veterinary medicine without the direct or indirect supervision from a licensed veterinarian. The available resources are, rather, intended to be used as a template and/or reference to assist each EMS/Fire/LE agency in developing their own prehospital protocols and standing orders for rendering emergency lifesaving preveterinary care to OpK9s injured in the line of duty.

Further the K9 TECC working group advises:

1. Each agency's guidelines and standing orders should be developed in collaboration and partnership with a veterinarian licensed in their state or region.
2. These resources are intended to be used ONLY:
  - a. For rendering emergency lifesaving care to OpK9s injured in the line of duty when licensed veterinary professionals are not readily available to render care, AND
  - b. By licensed or certified EMS paraprofessionals (EMTs, advanced EMTs, paramedics), LEOs, and/or K9 handlers in accordance with the level of their legal scope of practice for providing medical care to human casualties, and by their respective state's:
    - i. Veterinary Practice Act or statutes regulating the practice of veterinary medicine, AND
    - ii. Practice acts or statutes of their respective profession (e.g. state EMS statutes)
  - c. By the aforementioned personnel that have received training in K9 anatomy, K9 first responder care, and K9 TECC procedures under the direction of a licensed veterinary professional or a professional training organization that employs a licensed veterinarian as a medical director to oversee their training curriculum.

**SKILL SET:**

1. Familiarization with advanced monitoring techniques
2. Familiarization with transfusion protocols
3. Advanced airway management

**K9 TECC DISCLAIMER:**

The information and resources made available by the K9 TECC working group do not provide authorization

The practice of veterinary medicine is defined and governed on a state-by-state basis. The requirements and exemptions for practicing veterinary medicine may be

**K9 TECC Skill Set Based on Provider Level**

Provider Level	Pressure Bandage + Wound Packing	Hemostatic Agents	TQs	Needle Decompression	ETT	Surgical Airway
K9 handler	X	X	X			
LEO (nonhandler)	X	X	X			
EMR or equivalent	X	X	X	X*		
EMT or equivalent	X	X	X	X*	X*	
Advanced EMT or equivalent	X	X	X	X	X*	X*
Paramedic	X	X	X	X	X*	X*

EMR, emergency medical responder; EMT, emergency medical technician; LEO, law enforcement officer.

\*Only with special training, specialized protocol, and agency/OMD approval. Ideally, this skill set should be performed by all providers, but need to prove safety and efficacy before inclusion of additional provider levels. Other EMS/medical-related skills such as patient assessment, chest seal placement, splinting, and hypothermia management, should be considered standard for all levels of providers. Additional skills can be considered with agency approval.

found in the respective state's Veterinary Practice Act or in a section of the state's laws that regulates veterinary medicine.

## Bibliography

1. National Association of Emergency Medical Technicians. *Prehospital trauma life support*. 8th ed. Burlington, VT: Jones & Bartlett Publishers; 2016.
2. Joint Theater Trauma System Clinical Practice Guideline. Clinical management of military working dogs. 2012. [http://www.usairamedd.army.mil/assets/cpgs/Clinical\\_Mgmt\\_of\\_Military\\_Working\\_Dogs\\_Combined\\_19\\_Mar\\_12.pdf](http://www.usairamedd.army.mil/assets/cpgs/Clinical_Mgmt_of_Military_Working_Dogs_Combined_19_Mar_12.pdf). Accessed 20 February 2015.
3. Palmer LE, Martin L. Traumatic coagulopathy-Part 2: resuscitative strategies. *J Vet Emerg Crit Care*. 2014; 24(1):75–92.
4. Committee on Tactical Emergency Casualty Care. Tactical Emergency Casualty Care (TECC) guidelines. 2014. [http://www.c-tecc.org/images/content/TECC\\_Guidelines\\_-\\_JUNE\\_2014\\_update.pdf](http://www.c-tecc.org/images/content/TECC_Guidelines_-_JUNE_2014_update.pdf). Accessed 20 February 2015.
5. Palmer LE. Chapter 29: Fluid management in patients with trauma: restrictive versus liberal approach. In: de Moraes HA, DiBartola SP, eds. *Advances in fluid, electrolyte, and acid-base disorders*. *Vet Clin North Am Small Anim Pract*. 2017;47(2).
6. Palmer LE. Prehospital trauma life support for companion animals and 'operational canines'. *J Vet Emerg Crit Care (San Antonio)*. 2016;26:161–165.
7. Rita H, Palmer LE, Baker J, et al. Best practice recommendations for prehospital veterinary care of dogs and cats. *J Vet Emerg Crit Care (San Antonio)*. 2016;26:166–233.
8. Callaway DW, Smith ER, Cain J, et al. The Committee for Tactical Emergency Casualty Care (C-TECC): evolution and application of TCCC Guidelines to civilian high threat medicine. *J Spec Oper Med*. 2011;11(2):84–89.
9. Taylor WM. Canine tactical field care part one—thoracic and abdominal trauma. *J Spec Oper Med*. 2008;8(3):54–60.
10. US Special Operations Command. Canine Tactical Combat Casualty Care. In: *US Special Operations Command Advanced Tactical Paramedic Protocols Handbook*. 8th ed. St. Petersburg, FL: Breakaway Media; 2014:243–252.
11. Kakiuchi H, Kawarai-Shimamura A, Fujii Y, et al. Efficacy and safety of tranexamic acid as an emetic in dogs. *Am J Vet Res*. 2014;75(12):1099–1103.
12. Kelmer E, Segev G, Papashvilli V, et al. Effects of intravenous administration of tranexamic acid on hematological, hemostatic and thromboelastographic analytes in healthy dogs. *J Vet Emerg Crit Care (San Antonio)*. 2015;25(4):495–501.
13. Hansen IK, Eriksen T. Cricothyrotomy: possible first-choice emergency airway access for treatment of acute upper airway obstruction in dogs and cats. *Vet Rec*. 2014;174(1):17.
14. James T, Lane M, Crowe D, et al. A blind insertion airway device in dogs as an alternative to traditional endotracheal intubation. *Vet J*. 2015;203(2):187–191.
15. Breen PH, Isserles SA, Westley J, et al. Effect of oxygen and sodium thiosulfate during combined carbon monoxide and cyanide poisoning. *Toxicol Appl Pharmacol*. 1995;134(2):229–234.
16. Vesey CJ, Krapez JR, Varley JG, et al. The antidotal action of thiosulfate following acute nitroprusside infusion in dogs. *Anesthesiology*. 1985;62(4):415–421.
17. Oruc HH, Yilmaz R, Bagdas D, et al. Cyanide poisoning deaths in dogs. *J Vet Med A Physiol Pathol Clin Med*. 2006; 53(10):509–510.
18. Polderman KH. Application of therapeutic hypothermia in the ICU: opportunities and pitfalls of a promising treatment modality. Part 1: indications and evidence. *Intensive Care Med*. 2004;30(4):556–575.

---

Drs Palmer and Yee are co-leads of the K9 Tactical Emergency and Casualty Care Working Group. Guidelines, K9 TECC working group, and further resources are available at: <http://www.k9tecc.org/index.html>.

KEYWORDS: canines; K9s; Operational K9s; tactical emergency casualty care





Summer 2017  
Volume 17, Edition 2

# J SOM

JOURNAL of SPECIAL OPERATIONS MEDICINE™



THE JOURNAL FOR OPERATIONAL MEDICINE AND TACTICAL CASUALTY CARE



## *Inside this Issue:*

- › TCCC Guidelines Change 16-03
- › Assessment of Trainer Skill
- › Bioelectric Dressing for Blister Management
- › Rapid Vision Correction by SOF
- › Role 1 Resuscitation Team and REBOA
- › Preparing to Deploy to a Medically Austere Theater
- › Manikin Human-Patient Simulator Training
- › Complication of Attempted Surgical Airway
- › Albumin Fluid Resuscitation in TCCC
- › QuikClot® Combat Gauze™ Use in Afghanistan
- › Ongoing Series: Clinical Corner, Human Performance Optimization, Infectious Diseases, Injury Prevention, Prolonged Field Care, SOFsono Ultrasound Series, Special Talk, Unconventional Medicine, Book Review, TCCC Updates, TacMed Updates, and more!

*Dedicated to the  
Indomitable Spirit  
and Sacrifices of  
the SOF Medic*